### Identification type of numbers

**ARITHMETIC**

09

### **Numerical properties of the golden number**

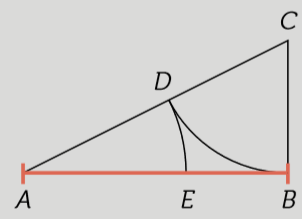
Be a segment and an interior point E that divides it into two segments and . It is said that point E divides the segment in golden proportion (or in average and extreme ratio) if it is fulfilled that:

The ratio of proportionality Φ is known as a gold number or a golden number. To perform the golden division of an segment, proceed as follows:

1. Draw segment perpendicular to such that
2. Draw segment
3. Draw an arc with radius from C and mark the point of intersection D with the segment to .
4. An arc is drawn from A of radius and is considered the point of intersection, E, with segment .

You can check that





Show the following properties of the gold number:

It is the positive solution of the quadratic equation *x*2 – *x* – 1 = 0.



**1**



Verify the following equalities: Φ2 = 1 + Φ and



**2**

Its successive powers form a succession of Fibonacci.



**3**

lim = Φ



**4**



+ + + ...

lim 1 + = Φ



**5**

1 +

1 +

1 + 1 + ...

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